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(54) **ELECTRIC WIRES TWISTING DEVICE AND TWISTED PAIR CABLE FABRICATION METHOD EMPLOYING THE SAME**

VORRICHTUNG ZUR VERDRILLUNG VON ELEKTRODRÄHTEN UND VERFAHREN ZUR
HERSTELLUNG VON VERDRILLTEN PAARKABELN DAMIT

DISPOSITIF DE TORSADAGE DE FILS ÉLECTRIQUES ET PROCÉDÉ DE FABRICATION DE CÂBLE
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Description

Technical Field

[0001] The present invention relates to an electric wires twisting device for twisting two electric wires together through rotation of a rotor to make a twisted pair cable that is excel in signal protection against electrical noise, for example, and a twisted pair cable fabrication method employing the same device.

Background Art

[0002] Conventionally, various types of twisted pair cable fabrication devices have been proposed for twisting two electric wires together for fabrication of a twisted pair cable. For example, PTL 1 describes a configuration in which connectors connected to both ends of two electric wires are fixed individually to corresponding receiving jigs, a circular driven gear (a rotor) having a narrow electric wire insertion groove is disposed in a position lying at a longitudinal center of the electric wires, the electric wires are inserted through the electric wire insertion groove, and the driven gear is rotated by a drive gear which is driven by a motor for twisting both the electric wires.

[0003] In addition, PTL 2 describes a configuration in which one end portions of two electric wires are fed out towards the other end portions by a drive roller while each being twisted within a cylindrical portion, and an elliptic cylindrical rotor, which is disposed at an intermediate portion in a longitudinal direction of the electric wires and through which both the electric wires are inserted, is moved towards the other end portions while being rotated in the same direction as the twisting direction to thereby twist the electric wires together.

Citation List

Patent Literature

[0004]

[PTL 1] JP-A-2000-149684(Fig. 1)

[PTL 2] JP-A-2007-227185(Fig. 1)

[0005] Further prior art is known from documents JP 2000-149684A and US 4527599A.

Summary of invention

Technical Problem

[0006] However, in the prior art that is described in PTL 1 above, since the electric wire insertion groove in the rotor is formed narrow in a width admitting almost two electric wires, there has been a concern that it is troublesome work to insert a pair of electric wires through the

rotor, involving some labors (when the electric wire insertion groove is formed wide, electric wires cannot be twisted together). In addition, in the prior art that is described in PTL 2, since the rotor is cylindrical, electric wires have to be inserted through the rotor before they are set in the twisting device, causing a problem that the work involved is troublesome.

Solution to Problem

[0007] The invention has been made in view of the problems inherent in the prior art and an object thereof is to provide an electric wires twisting device which enables the insertion of two electric wires through a rotor easily and in an ensured fashion, which ensures the twisting of the two electric wires and which can fabricate a twisted pair cable with good workability and productivity.

[0008] In order to achieve the above object, according to the present invention, there is provided an electric wires twisting device according to claim 1.

[0009] According to the configuration described above, the pair of electric wires are inserted from the outer opening while being arranged parallel so as to be individually disposed on both the diametrical sides of the twisting rod. Then, the twisting rod is rotated together with the rotor by the rotary driving portion, whereby the pair of electric wires are twisted together. The insertion of the electric wires into the rotor is implemented by moving the pair of electric wires in a direction which intersects the direction in which they are arranged at right angles or moving the rotor towards the electric wires.

[0010] Preferably, the rotary driving portion has a timing belt which is in contact with a gear portion on an outer circumference of the rotor over a range greater than the width of the slit portion.

[0011] According to the configuration described above, the driving force is not interrupted by the slit portion, and the rotor rotates at a uniform speed by being given an ensured driving force by the timing belt at all times.

[0012] An electric wire guide member provided in a frame has a pair of inclined surfaces which continue individually to both sides of the slit portion in the direction of the width of the slit portion, and the pair of electric wires are respectively brought into contact with the pair of inclined surfaces in a state that an interval of the pair of electric wires is greater than the width of the slit portion.

[0013] According to the configuration described above, the pair of electric wires are picked up in an ensured fashion by the pair of inclined surfaces of the electric wire guide member so as to be guided smoothly into the slit portion along the inclined surfaces. The pair of electric wires, which are spaced apart wider than the slit portion from each other, are once compressed to reduce the space therebetween by the slit portion. However, at the point in time when they come out of the slit portion to the diametrically wider inner circumferential surface, the pair of electric wires are increased in space therebetween again so as to be individually inserted to both the sides

of the twisting rod in the ensured fashion.

[0014] According to the present invention, there is also provided a twisted pair cable fabrication method according to claim 3.

[0015] According to the configuration described above, the pair of electric wires are inserted into the rotor by way of the slit portion in such a state that the ends of the pair of electric wires are fixed with the corresponding clamps, and the twisting rod twists the pair of electric wires together through rotation of the rotor. Then, the resulting twisted pair cable is removed from the slit portion in the rotor.

Advantageous Effects of Invention

[0016] According to the first aspect of the invention, the respective electric wires can be inserted along the slit portion so as to be individually disposed on the diametrical sides of the twisting rod easily and in the ensured fashion, whereby the twisting workability can be improved. In addition, the twisting of the electric wires can be implemented in the ensured fashion by causing the twisting rod to rotate together with the rotor.

[0017] According to the second aspect of the invention, the rotor can be driven at all times irrespective of the size of the width of the slit portion so as to prevent the occurrence of unevenness in rotation speed, thereby making it possible to form the twisted pair cable with good pitch accuracy.

[0018] According to the first aspect of the invention, the pair of electric wires which are spaced apart wider than the width of the slit portion are once compressed to reduce the space therebetween at the narrow slit portion and are increased in space therebetween again so that they move away outwards from each other so as to be individually disposed on both the sides of the twisting rod at the point in time when the pair of electric wires come out of the slit portion into the diametrically wider inner circumferential surface. Thus, the electric wires can be twisted in an ensured fashion by the twisting rod.

[0019] According to the third aspect of the invention, the electric wires can be inserted into and removed from the rotor easily and in the ensured fashion, and the fabrication of twisted pair cables can be automated so as not only to increase the productivity of twisted pair cables but also to enable the aesthetic and ensured twisting of electric wires by the twisting rod.

Brief Description of Drawings

[0020]

Fig. 1 is a perspective view showing an embodiment of an electric wires twisting device according to the invention.

Fig. 2 is a perspective view showing a state in which electric wires are disposed (set) above a rotor of the electric wires twisting device.

Fig. 3 is a perspective view showing a state in which the electric wires are inserted into the rotor.

Fig. 4 is a perspective view showing a state in which the electric wires are inserted completely in the rotor.

Fig. 5A is a plan view showing a state in which the electric wires are twisted by the rotor, and Fig. 5B is a plan view showing a completed twisted pair cable.

Fig. 6 is a perspective view showing a form of a twisted pair cable fabrication system to the electric wires twisting device can be applied.

Description of Embodiments

[0021] Figs. 1 to 4 show an embodiment of an electric wires twisting device according to the invention.

[0022] As is shown in Fig. 1, this electric wires twisting device 1 includes a circularly annular rotor 3 having a slit portion 2 in part thereof in a circumferential direction and disposed vertically, a cylindrical twisting rod 4 provided on a circular inner circumferential surface 3a of the rotor 3 so as to be erected therefrom while facing the slit portion 2, a rotary driving device 5 for rotary driving the rotor 3, and a lifting drive device 6 (a setting portion) for lifting up and down the rotor 3 together with the rotary driving device 5.

[0023] The rotary driving device 5 includes a timing belt 8 which meshes with a gear portion 7 provided on a circular outer circumferential surface of the rotor at a gear portion 8a formed on an outer circumference thereof (in the drawings, shown in a plan view as a matter of convenience), a drive gearwheel 9 which meshes with a gear portion 8b (shown in a plan view as a matter of convenience) formed on an inner circumference of the timing belt 8, a horizontal motor 10 which is coupled to the drive gearwheel 9 at a shaft portion thereof, a pair of upper and lower guide gearwheels 11 which press the timing belt 8 against the gear portion 7 on the outer circumference of the rotor 3. A length of a belt portion (a portion in press contact with the rotor) (also denoted by reference numeral 8b) between the pair of guide gearwheels 11 is larger than an inner width of the slit portion 2, whereby the rotor 3 is driven in an ensured fashion even at the cut-out slit portion 2.

[0024] The lifting drive device 6 includes mainly a vertical air cylinder 12. An upward rod 12a of the air cylinder 12 is connected to a unit frame 14 via a horizontal connecting rod 13. The unit frame 14 includes a vertical strut 15 placed at one side portion and two front and rear vertical plate portions 16 which are fixed in place with the strut 15 held therebetween. The rotor 3 is disposed between the two plate portions 16. Gearless outer circumferential surfaces 3b which lie before and after the gear portion 7 on the outer circumference of the rotor 3 are supported by a plurality of rotatable guide rollers (bearings) 17 with a collar 17a, and shaft portions 17b of the guide rollers 17 and shaft portions 11a of the guide gearwheels 11 are fixed to the front and rear plate portions 16.

[0025] The front and rear plate portions 16 each have

a U-shaped cut-out hole 16a which has a slightly larger width than a diameter of the inner circumferential surface 3a of the rotor 3. The guide rollers 17 support rotatably the rotor 3 in the air while positioning the rotor 3 vertically and horizontally. The rotor 3 may also be referred to as a rotary pulley.

[0026] A bottom portion of the air cylinder 12 is fixed to a horizontal base plate 18, and the base plate 18 is fixed, in turn, to an upper surface of a base plate 19 which lies on a lower surface side of the base plate 18. A slide portion (not shown) which is brought into engagement with a longitudinal horizontal rail of a system, which will be described later, is fixed to the lower base plate 19. A vertical slide engagement portion 15a (Fig. 2) is provided on one side of the strut 15 which is connected to the upper connecting rod 13. The slide engagement portion 15a is in engagement with a vertical rail 20a of a vertical base plate 20 (Fig. 2) which is fixedly erected on the base plate 18 along the air cylinder 12 so as to slide vertically.

[0027] The rotor 3 and the twisting rod 4 are formed of, for example, metal. A diameter of the inner circumference of the rotor 3 is formed larger than a width W (Fig. 2) of the slit portion 2. As is shown in Fig. 2, a diameter of the twisting rod 4 is smaller than the width W of the slit portion 2. A distal end 4a of the twisting rod 4 has a semi-spherical shape and is situated at almost the same height as a lower end (a proximal end) of the slit portion. A lower end portion (a proximal end portion) 4b of the twisting rod 4 is stepped to be larger diametrically than the distal end portion 4a and is fixed to an annular circumferential wall 3c of the rotor 3 through press fitting or screwing.

[0028] The twisting rod 4 rotates together with the rotor 3. When the slit portion 2 is situated in an upper position, the twisting rod 4 is positioned vertically upwards. The motor 10 (Fig. 1) is controlled so that the slit portion 2 is positioned in the upper position at all times when the rotor 3 stops by a control unit (not shown).

[0029] As is shown in Fig. 1, a pair of left and right electric wire guide members 21, having inclined surfaces 21a which are inclined so as to expand a space therebetween in a tapered fashion as they extend upwardly, are fixedly provided between the front and rear plate portions 16 at an upper portion of the slit portion 2. A triangular, vertical electric wire guide plate 21c is provided integrally on each guide member 21 at front and rear thereof. Each guide plate 21c has an inclined side portion 21b which is tapered downwardly to extend along the cut-out hole 16a in the plate portion 16 so as to increase a space defined with an inclined side portion 21b of a diametrically corresponding electric wire guide plate 21c. The left and right inclined surfaces 21a continue to approach left and right upper ends of the slit portion 2 with almost no gap.

[0030] Figs. 2 to 4 show a twisted pair cable fabrication method employing the electric wires twisting device 1. In Fig. 2, the air cylinder 12 is compressed when the rotor 3 stops, and a unit main body portion 22, made up of the rotor 3, the gearwheels 9, 11, the timing belt 8, the motor

10, the rollers 17 and the plate portions 16, is lowered to be positioned in place. In this state, a pair of electric wires 23 are disposed above the left and right inclined surfaces 21a of the guide members 21 in such a state that the electric wires 23 are taut with a certain tension (in such a state that the electric wires 23 are stretched in a straight-line fashion in a longitudinal direction (a front-to-rear direction)).

[0031] In this state, the air cylinder 12 is extended, whereby the unit main body portion 22 rises together with the rod 12a. As is shown in Fig. 3, the pair of electric wires 23 are compressed at part to reduce the space defined therebetween (with the compressed portion denoted by reference numeral 23a) while in sliding contact with the inclined surfaces 12a of the corresponding guide members 21 and are guided into an inner space 3d of the rotor 3 along the corresponding inclined surfaces 21a. Then, as is shown in Fig. 4, the vertical twisting rod 4 is raised together with the rotor 3 by the rod 12a of the air cylinder 12 which is extended so as to be inserted between the pair of electric wires 23, whereby the electric wires 23 are individually disposed on left- and right-hand sides of the twisting rod 4 at a center in a height direction of the rotor 3 within the inner space 3d.

[0032] As is shown in Fig. 3, by the pair of electric wires 23 which are stretched in the longitudinal direction being compressed (at the portions denoted by reference numeral 23a) inwardly to reduce the space therebetween along the inclined surfaces 21a against the tension, a restoring force is exerted on the respective electric wires 23 outwardly (in a space-opening direction). Then, the electric wires 23 slide downwards along vertical inner surfaces (also denoted by reference numeral 2) of the slit portion 2 from the inclined surfaces 21a. The electric wires 23 are restored to be expanded outwardly or to increase the space therebetween at a point in time when the electric wires 23 advance from lower ends of the slit portion 2 into the inner space 3d which is larger diametrically than the slit portion 2, whereby the electric wires 23 are spaced apart further so as to be individually disposed on the left- and right-hand sides of the twisting rod 4 without interfering with the twisting rod 4 lying in the midst thereof in an ensured fashion (the twisting rod 4 is inserted between the pair of electric wires 23 in an ensured fashion).

[0033] In Fig. 3, when the electric wires 23 are lowered relatively (in reality, the guide members 21 and the rotor 3 are raised), inclined portions 23b which continue to the compressed narrow portions 23a which lie before and after the inclined portions 23b are guided smoothly along the front and rear lower inclined side portions 21b. The inclined side portions 21b also guide relatively upwards the pair of left and right electric wires remaining at an end portion of the resulting twisted pair cable in a smooth fashion when removing the twisted pair cable from the rotor 3.

[0034] The rotor 3 rotates from the state shown in Fig. 4 via the timing belt 8 by the drive of the motor 10, and

as is shown in Fig. 5A, the twisting rod 4 rotates together with the rotor so as to twist the pair of electric wires 23. Front and rear ends of the individual electric wires 23 are fixed with front and rear pairs of clamps 24, 25, whereby the electric wires 23 are twisted between the clamps 24, 25 and the twisting rod 4.

[0035] The slit portion 2 of the rotor 3 is positioned in the upper position at a point in time when the twisting is completed, and the position of the rotor 3 is specified by controlling the motor 10 so that the twisting rod 4 is positioned vertically upwards. Following this, the air cylinder 12 is compressed as is shown in Fig. 2, and the unit main body portion 22 is lowered together with the rod 12a, whereby the resulting twisted pair cable is removed upwards from the slit portion 2. Fig. 5B shows an example of a twisted pair cable 23', and terminals 26 are press attached to both ends of electric wires 23.

[0036] Fig. 6 shows one form of a twisted pair cable fabrication system to which the electric wires twisting device 1 is applied and a twisted pair cable fabrication method.

[0037] This fabrication system 27 has electric wire clamps 30, 31 on three planes of front and rear intermittent rotary elements 28, 29, respectively. The clamps 30 at one side (front side) are connected rotatably to corresponding motors 32. The other clamps 31 at the other side (rear side) are horizontal long air cylinders and are withdrawn together with corresponding base plates 34 so as to apply a tension to the electric wires 23. The intermittent rotary elements 28, 29 are supported on struts 35, 36, respectively, so as to rotate intermittently by 1/3 of the circumference by intermittent driving devices 37, 38, respectively. In the three planes of each of the intermittent rotary elements, 28, 29, a near plane constitutes an electric wire setting plane 39, a lower plane an electric wires twisting plane 40, and a far plane an electric wire discharge plane 41. In reality, the front and rear intermittent rotary elements 28, 29 are spaced largely in the front-to-rear direction for twisting the electric wires 23.

[0038] The electric wires twisting unit 1 is disposed on a horizontal base portion (not shown) of the system 27 between the lower electric wire setting planes 40. Slide engagement portions on the base plate 19 (Fig. 1) of the unit 1 are brought into slidable engagement with longitudinal horizontal rails (not shown) on the base portion, whereby the base plate 19 together with the whole of the unit 1 can move along the rails by a longitudinal translation drive unit such as a horizontal ball screw or a rack-and-pinion mechanism.

[0039] Both the ends of the electric wires 23 are fixedly gripped to the front and rear clamps 30, 31 at the electric wire setting planes 39. When the intermittent rotary elements 28, 29 rotate by 1/3 the circumference in a direction indicated by an arrow A, the electric wires 23 so set are then move to the lower twisting planes 40. In this state, as is shown in Fig. 4, when the air cylinder 12 is operated to be extended, the electric wires twisting device main body portion 22 is raised, whereby the twisting rod 4 en-

ters between the pair of electric wires 23. The electric wires twisting device 1 is withdrawn as near as the rear clamp 39, and in this state, the rotor 3 is rotated by the motor 10. At the same time, the front clamps 30 are rotated in the same direction at the same speed by the motor 32, and at the same time, the electric wires twisting device 1 advances along the rails of the base portion, whereby the electric wires 23 are twisted between the rear clamps 30 and the rotor 3.

[0040] When the twisting of the electric wires is completed, as is shown in Fig. 2, the air cylinder 12 is operated to be compressed, and the electric wires twisting device main body 22 is lowered. Then, the resulting twisted pair cable 23' is removed upwards from the rotor 3 while being clamped at the ends by the clamps 30, 31. Following this, the intermittent rotary elements 28, 29 rotate further 1/3 the circumference in the direction indicated by the arrow A, and the twisted pair cable 23' is moved to the discharge planes 41, whereby the twisted pair cable 23' is discharged after a tape is wound around each end thereof.

[0041] In this way, the rotor 3 is raised, and the pair of electric wires 23 are accommodated within the rotor from the slit portion 23. Then, the rotor 3 is lowered after the twisting of the electric wires is completed, and the resulting twisted pair cable 23' is removed from the slit portion 2. Thus, the three steps of setting the electric wires, twisting the electric wires together and discharging the resulting twisted pair cable can be executed in succession, thereby making it possible to increase the productivity of twisted pair cables 23'. A separate proposal will be made with respect to the fabrication system 27.

[0042] In the embodiment, while the timing belt 8 is used to drive the rotor 3, it is possible to use two gear-wheels which are spaced apart wider than the width dimension of the slit portion 2 in place of the timing belt 8. In addition, it is possible to form inclined surfaces which are inclined as tapered at open ends of the slit portion 2 in the rotor 3 without using the guide members 21. However, when such inclined surfaces are provided on the rotor 3, the inclined surfaces will be narrower than the inclined surfaces 21a of the guide members 21 in relation to the driving of the rotor 3. Therefore, the guide members 21 are preferably used to ensure the guide of the electric wires.

[0043] In addition, in place of the system 27 shown in Fig. 6, it is possible to use a system (not shown) which includes fixedly only the front and rear electric wire clamps 30, 31 which are provided on the lower front and rear electric wires twisting planes 40 and the motors 32 on the front side shown in Fig. 6 or a system (not shown) which includes only the front and rear clamps 30, 31 excluding the motors 32.

[0044] As this occurs, a configuration can also be adopted in which the electric wires twisting unit 1 is disposed not below but above the electric wires 23, and the electric wires twisting unit 1 is lowered so that the electric wires 23 are inserted into the rotor 3. In addition, a configuration can also be adopted in which the slit portion 2

is disposed not upwards but sideways, and the air cylinder 12 is disposed not vertically but horizontally, whereby the pair of electric wires 23 which are parallel vertically are inserted into the slit portion 2 sideways so as to be individually disposed on upper and lower sides of the horizontal twisting rod 4.

[0045] The present application is based on Japanese Patent Application No. 2010-166698 filed on July 26, 2010.

Industrial Applicability

[0046] The electric wires twisting device and the twisted pair cable fabrication method employing the same unit can be made use of, for example, in producing twisted pair cables intended to prevent noise of signal wires of motor vehicles with good efficiency.

Reference Signs List

[0047]

1	electric wires twisting device
2	slit portion
3	rotor
3a	inner circumferential surface
4	twisting rod
5	rotary driving device
7	gear portion
8	timing belt
14	frame
21	electric wire guide member
21a	inclined surface
23	electric wire

Claims

1. An electric wires twisting device (1) for twisting a pair of electric wires (23) comprising:

a cylindrical rotor (3) that has a slit portion (2) provided in a part of the rotor (3) in a circumferential direction of the rotor (3), an inner diameter of the rotor (3) being greater than a width (W) of the slit portion (2);

a twisting rod (4) provided on an inner circumferential surface (3a) of the rotor (3) so as to be projected therefrom and so as to face the slit portion (2);

a rotary driving portion (5) that rotates the rotor (3); and

a setting portion (6) for insertion of the pair of electric wires (23) parallel in a direction of the width (W) of the slit portion (2) into an inner side of the circumferential surface (3a) of the rotor (3) so as to be individually disposed on both sides of the twisting rod (4),

wherein an electric wire guide member (21) provided in a frame (14) has a pair of inclined surfaces (21 a) which continue individually to both sides of the slit portion (2) in the direction of the width (W) of the slit portion (2); and

wherein the pair of electric wires (23) can respectively be brought into contact with the pair of inclined surfaces (21a) in a state that an interval of the pair of electric wires (23) is greater than the width (W) of the slit portion (2).

2. The electric wires twisting device (1) according to claim 1, wherein the rotary driving portion (5) has a timing belt (8) which is in contact with a gear portion (8b) on an outer circumference of the rotor (3) over a range greater than the width (W) of the slit portion (2).

3. A twisted pair cable fabrication method employing the electric wires twisting device (1) according to claim 1, comprising:

inserting the pair of electric wires (23) through the slit portion (2) by using the setting portion (6) wherein the pair of electric wires (23) is respectively be brought into contact with the pair of inclined surfaces (21a) of the electric wire guide member (21) in a state that an interval of the pair of electric wires (23) is greater than the width (W) of the slit portion (2) so as to be individually disposed on both sides of the twisting rod (4) in a state that both ends of the pair of electric wires (23) are fixed by clamps (24, 25) and the pair of electric wires (23) is applied with tension; and rotating the twisting rod (4) together with the rotor (3) so as to twist the pair of electric wires (23) by the twisting rod (4).

Patentansprüche

1. Eine Vorrichtung (1) zur Verdrillung von Elektrodrähten zum Verdrillen eines Paares von Elektrodrähten (23), aufweisend:

einen zylindrischen Rotor (3), der einen Schlitzabschnitt (2) hat, der in einem Teil des Rotors (3) in einer Umfangsrichtung des Rotors (3) bereitgestellt ist, wobei ein Innendurchmesser des Rotors (3) größer als eine Weite (W) des Schlitzabschnitts (2) ist, einen Verdrehstab (4), der an einer inneren Umfangsoberfläche (3a) des Rotors (3) so vorgesehen ist, dass dieser davon hervorsteht und gegenüber dem Schlitzabschnitt (2) ist, einen Drehantriebsabschnitt (5), der den Rotor (3) dreht, und

einen Setzabschnitt (6), zum Einsetzen des Paares von Elektrodrähten (23) parallel in einer Richtung der Weite (W) des Schlitzabschnitts (2) in eine Innenseite der Umfangsoberfläche (3a) des Rotors (3), um individuell an beiden Seiten des Verdrehstabs (4) vorgesehen zu sein,

wobei ein Elektrodrahtführungsteil (21), das in einem Rahmen (14) bereitgestellt ist, ein Paar schräger Oberflächen (21 a) hat, die kontinuierlich jeweils an beiden Seiten des Schlitzabschnitts (2) in der Richtung der Weite (W) des Schlitzabschnitts (2) verlaufen, und

wobei das Paar von Elektrodrähten (23) entsprechend in Kontakt mit dem Paar schräger Oberflächen (21a) in einem Zustand gebracht werden kann, bei dem ein Abstand des Paares von Elektrodrähten (23) größer ist als die Weite (W) des Schlitzabschnitts (2).

2. Die Vorrichtung (1) zur Verdrehung von Elektrodrähten gemäß Anspruch 1, wobei der Drehantriebsabschnitt (5) einen Antriebsriemen (8) hat, der in Kontakt mit einem Getriebeabschnitt (8b) an einer äußeren Umfangsfläche des Rotors (3) über einen Bereich ist, der größer als die Weite (W) des Schlitzabschnitts (2) ist.

3. Eine Methode zum Herstellen eines verdrehten Paarkabels unter Benutzung der Vorrichtung (1) zur Verdrehung von Elektrodrähten gemäß Anspruch 1, beinhaltend:

Einsetzen des Paares von Elektrodrähten (23) durch den Schlitzabschnitt (2) unter Benutzung des Setzabschnitts (6), wobei das Paar von Elektrodrähten (23) entsprechend in Kontakt mit dem Paar der schrägen Oberflächen (21a) des Elektrodrahtführungsteils (21) in einem Zustand gebracht wird, bei dem ein Abstand des Paares von Elektrodrähten (23) größer ist als die Weite (W) des Schlitzabschnitts (2), um individuell an beiden Seiten des Verdrehstabs (4) in einem Zustand vorgesehen zu sein, bei dem beide Enden des Paares von Elektrodrähten (23) mittels Klammern (24, 25) fixiert sind und das Paar von Elektrodrähten (23) mit Spannung versehen wird, und

Drehen des Verdrehstabs (4) zusammen mit dem Rotor (3), um das Paar von Elektrodrähten (23) mittels des Verdrehstabs (4) zu verdrehen.

Revendications

1. Dispositif de torsion de câbles électriques (1) pour la torsion d'une paire de câbles électriques (23) comprenant :

un rotor cylindrique (3) qui présente une partie fendue (2) prévue dans une partie du rotor (3) dans un sens circonférentiel du rotor (3), un diamètre interne du rotor (3) étant supérieur à une largeur (W) de la partie fendue (2) ;
une barre de torsion (4) prévue sur une surface circonférentielle interne (3a) du rotor (3) afin d'être projetée depuis celui-ci et afin de faire face à la partie fendue (2) ;
une partie d'entraînement rotatif (5) qui fait tourner le rotor (3) ; et
une partie de mise en place (6) pour l'insertion de la paire de câbles électriques (23) de manière parallèle dans un sens de la largeur (W) de la partie fendue (2) dans un côté interne de la surface circonférentielle (3a) du rotor (3) afin d'être individuellement disposée sur les deux côtés de la barre de torsion (4),

dans lequel un élément guide de câble électrique (21) prévu dans un châssis (14) présente une paire de surfaces inclinées (21a) qui continue individuellement vers les deux côtés de la partie fendue (2) dans le sens de la largeur (W) de la partie fendue (2) ; et

dans lequel la paire de câbles électriques (23) peut respectivement être portée au contact de la paire de surfaces inclinées (21a) dans un état tel qu'un intervalle de la paire de câbles électriques (23) est supérieur à la largeur (W) de la partie fendue (2).

2. Dispositif de torsion de câbles électriques (1) selon la revendication 1, dans lequel la partie d'entraînement rotatif (5) présente une courroie de distribution (8) qui se trouve en contact avec une partie d'engrenage (8b) sur une circonférence externe du rotor (3) sur une plage supérieure à la largeur (W) de la partie fendue (2).

3. Procédé de fabrication de câble en paire torsadée utilisant le dispositif de torsion de câbles électriques (1) selon la revendication 1, comprenant :

l'insertion de la paire de câbles électriques (23) à travers la partie fendue (2) en utilisant la partie de mise en place (6) dans lequel la paire de câbles électriques (23) est respectivement portée au contact de la paire de surfaces inclinées (21a) de l'élément guide de câble électrique (21) sous un état tel qu'un intervalle de la paire de câbles électriques (23) est supérieur à la largeur (W) de la partie fendue (2) afin d'être individuellement disposée sur les deux côtés de la barre de torsion (4) sous un état tel que les deux extrémités de la paire de câbles électriques (23) soient fixées par des étriers de fixation (24, 25) et une tension est appliquée à la paire de câbles électriques (23) ; et

la rotation de la barre de torsion (4) conjointement au rotor (3) afin de torsader la paire de câbles électriques (23) par la barre de torsion (4).

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FIG.1

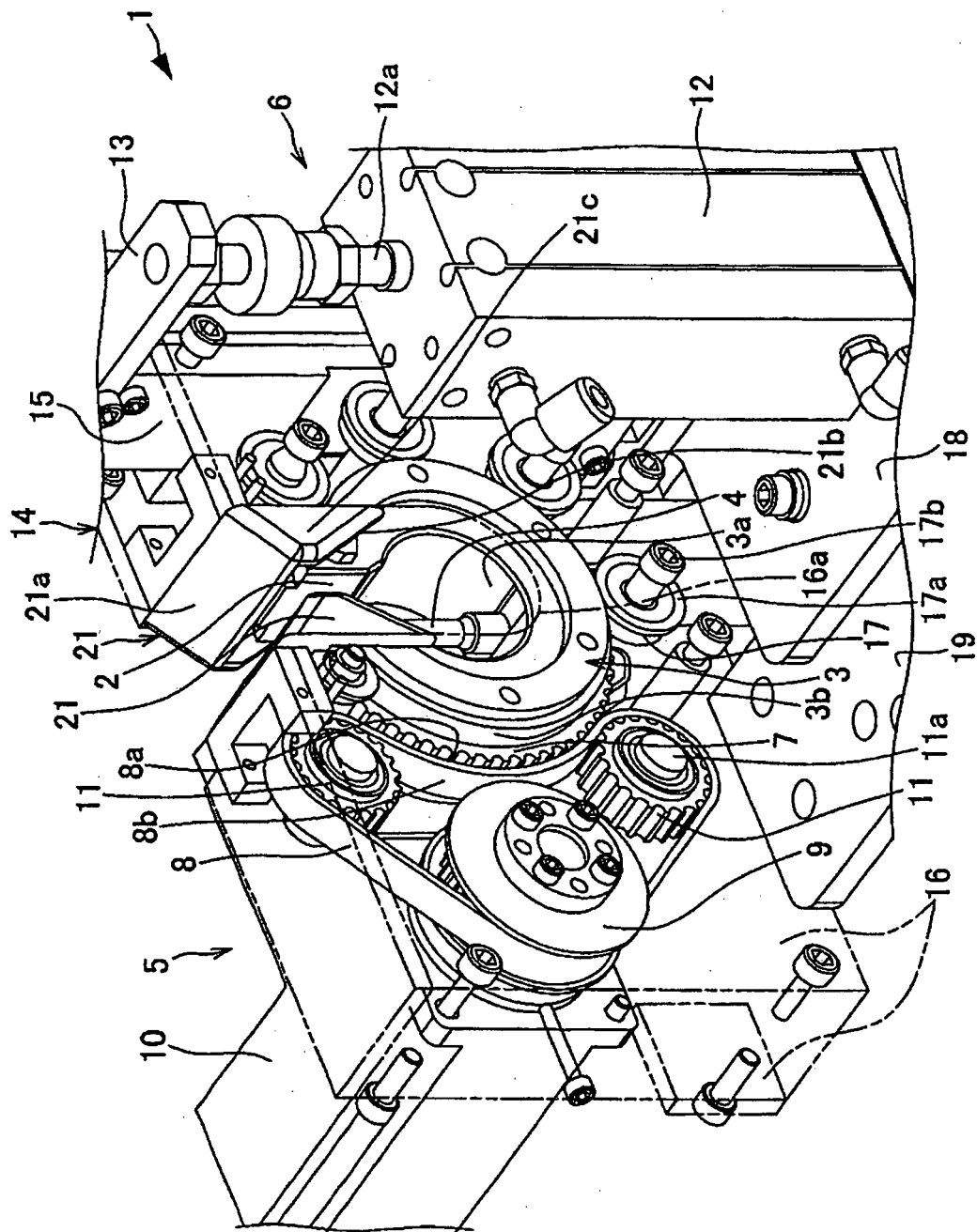


FIG.2

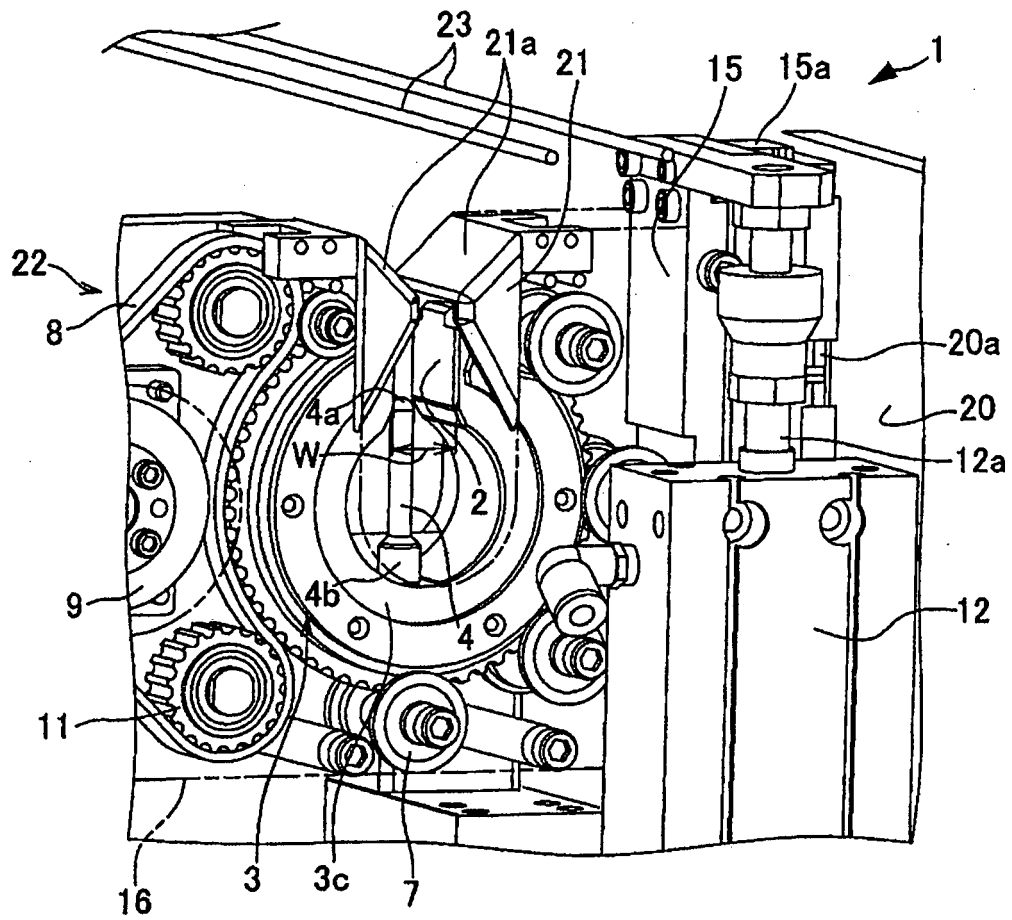


FIG.3

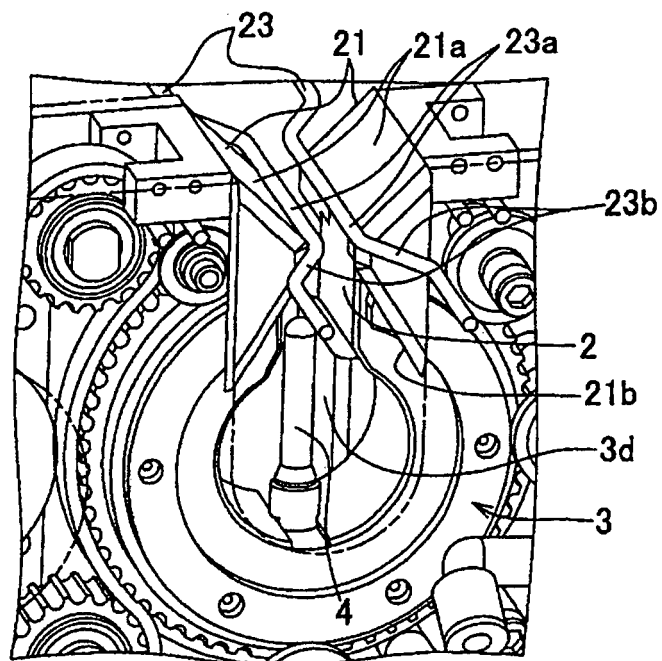


FIG. 4

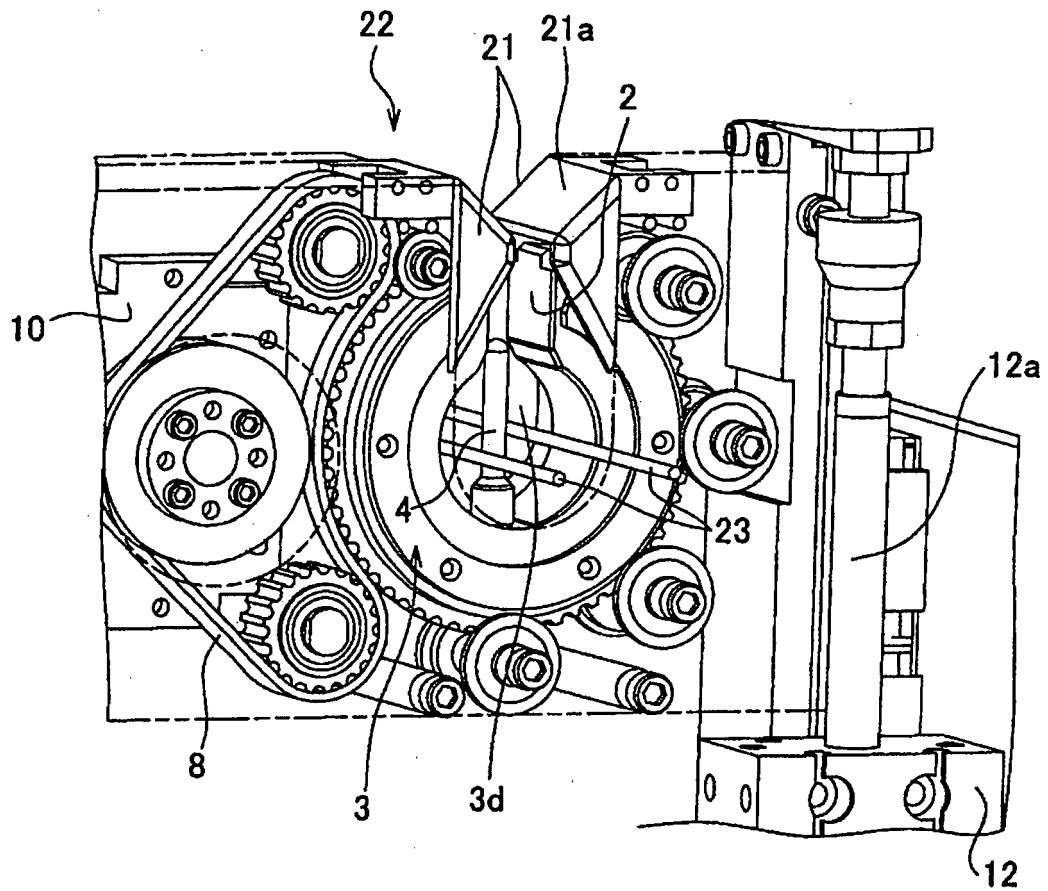


FIG. 5A

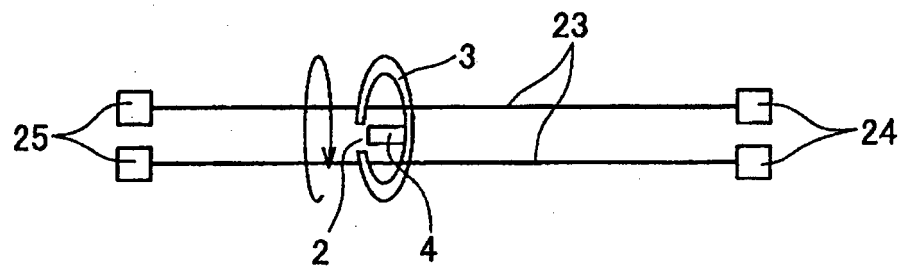


FIG. 5B

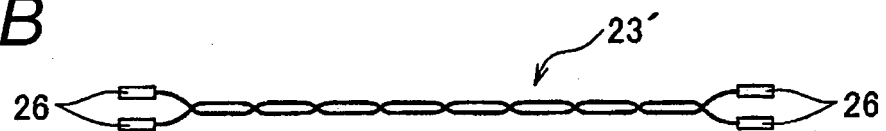
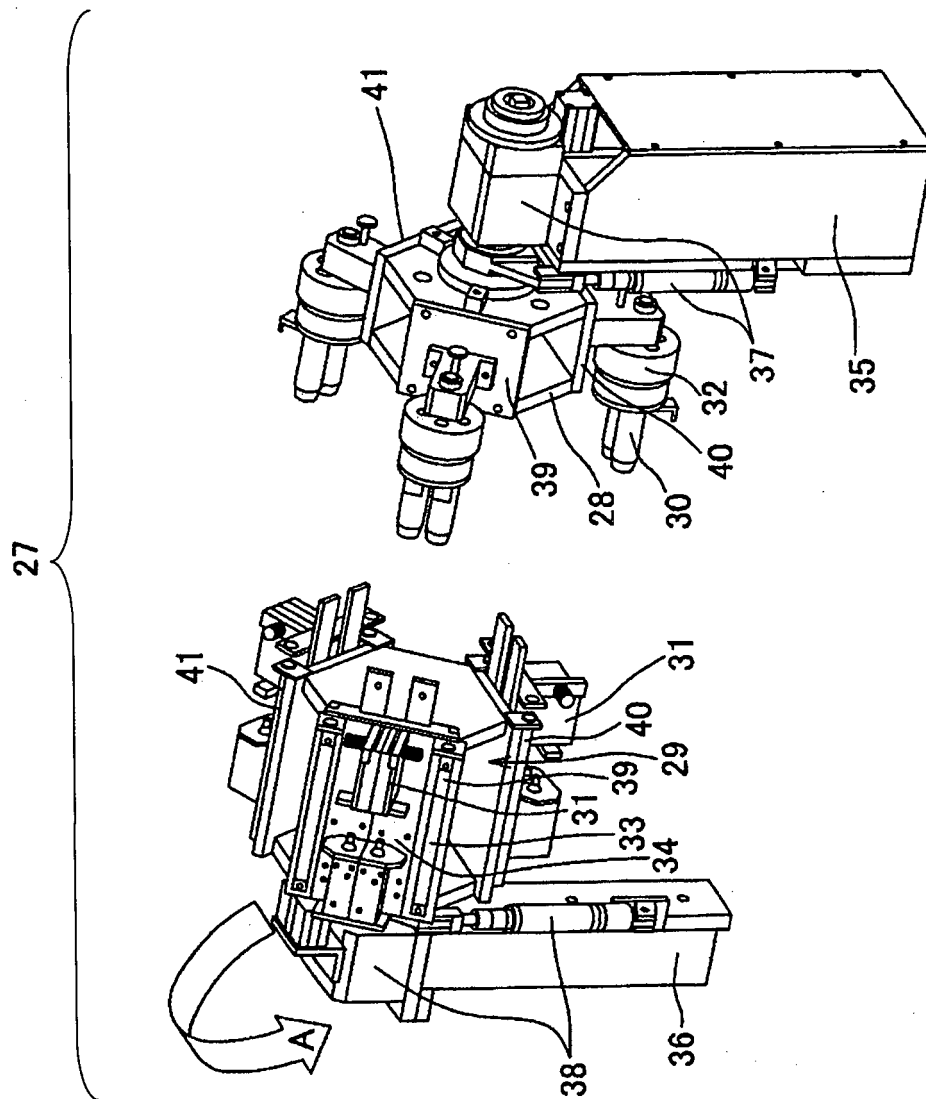


FIG. 6



REFERENCES CITED IN THE DESCRIPTION

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